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Automated and Manual Testing

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AMAC Accessibility
College of Design
Georgia Institute of Technology

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Today's Agenda

- Introductions
- Brief Overview of AMAC Accessibility
- Understanding the Needs of People with Disabilities
- Manual Testing
- Mobile Testing
- Automated Testing/Code Inspection
- Q&A

AMAC Accessibility

- AMAC Accessibility provides practical solutions for challenges faced daily by individuals with disabilities.
- We focus on solutions that offer utility, usability, and durability.
- AMAC offers services including disability compliance consultation, braille, captioning, accessible digital content, and assistive technology.

AMAC Services

- Accessibility Compliance Consultations offer training, technical assistance, customer support, and evaluation of overall website accessibility and usability testing

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Understanding the Needs of People with Disabilities

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How People with Disabilities Access Digital Content

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- Auditory
- Cognitive and Neurological
- Physical
- Speech
- Visual

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Auditory

- Mild or moderate hearing loss in one or both ears
- Substantial and uncorrectable impairment of hearing in both ears
- Auditory Disabilities – hear sounds but not always speech
- Examples: Hard of hearing; Deafness; Deaf-blindness

Cognitive and Neurological

- Disorders of any part of the nervous system including brain and the peripheral nervous system
- This can impact how well people hear, move, see, speak and understand information
- Does not necessarily affect the intelligence of a person
- Examples: ADHD; ASD; Learning Disabilities; Mental Health Disabilities; Memory Impairments; MS; Seizure Disorders

Physical

- **Involves weakness, limitations of muscular control and sensation, joint problems, pain that impedes movement, or missing limbs**
- **Examples: Amputation; Arthritis; Fibromyalgia; Rheumatism; Reduced Dexterity, Muscular Dystrophy; Repetitive Stress Injury; Tremors and Spasms; Quadriplegia**

Speech

- **Difficulty producing speech that is recognizable by others or by voice recognition software**

- **Examples: Apraxia of speech; Cluttering; Dysarthria; Speech Sound Disorder; Stuttering; Muteness**

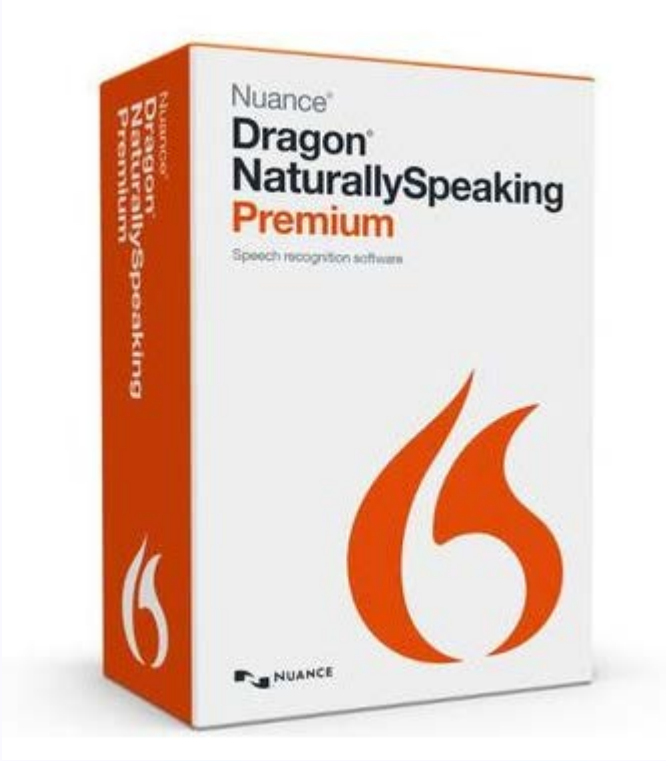
Visual

- **Includes mild or moderate visual impairment in one or both eyes, to substantial and uncorrected loss of vision in both eyes**

- **Examples: Color Blindness; Low Vision; Blindness; Deaf-blindness**

Speech Recognition Software

- Turn spoken words into text
- Connect with the timing of your thoughts
- Dictation speed 70 to 100 words per minute

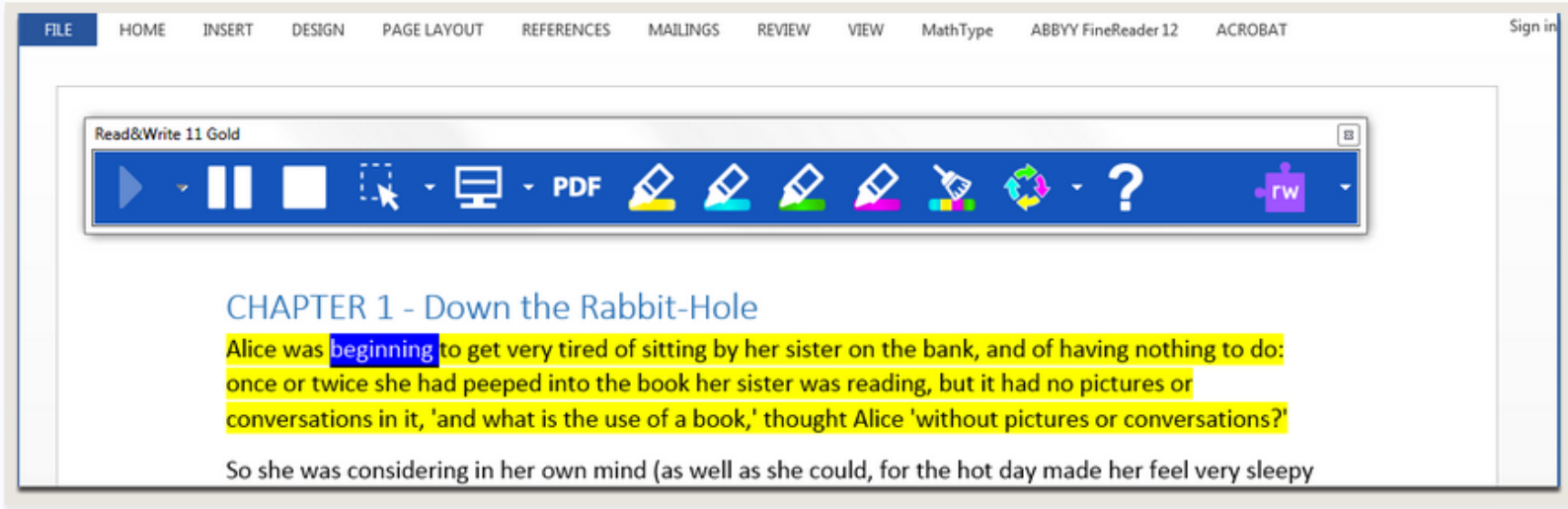


ClaroRead

- Text-to-Speech
- Visual Highlighting
- Read back any on-screen text and program commands
- High Quality Screen Reader
- Keyboard Echo
- Save to Audio

Read & Write Gold

- Text-to-Speech software
- Reads Word, PDF files and web pages as long as they're accessible
- Text Highlighting
- Allows for creation of audio version
- Provides customizable toolbars



Where Do I Start???

- A wide array of AT Products
- Lack of experience using AT
- So many browsers, operating systems and devices

Step Away from the Mouse!

- **Keyboard Accessibility Covers a Multitude of Sins**

- **Tab and Reading Order**
- **Visual Focus**
- **Interactive Form Controls**
- **Keyboard-Triggered Event Handlers**

Screen Readers

- JAWS
- NVDA
- VoiceOver (Mac)
- Narrator
- Window-Eyes
- VoiceOver (iOS)
- TalkBack for Android

Testing with Browsers

- **IE 11**
- **Firefox - Extended Support Release (ESR)**
- **Safari**

Screen Readers: Why All the Fuss?

- **Critical Stops Abound for Inaccessible Sites**
- **Accessibility for Screen Readers = Accessibility for Many Other AT Solutions**
- **Liability and Powerful Advocacy Groups**
- **Some Examples of Exceptions: Deaf and Hard-of-Hearing; Cognitive and Neurological Considerations; Low Vision and Color Blindness**

NVDA: Pros and Cons

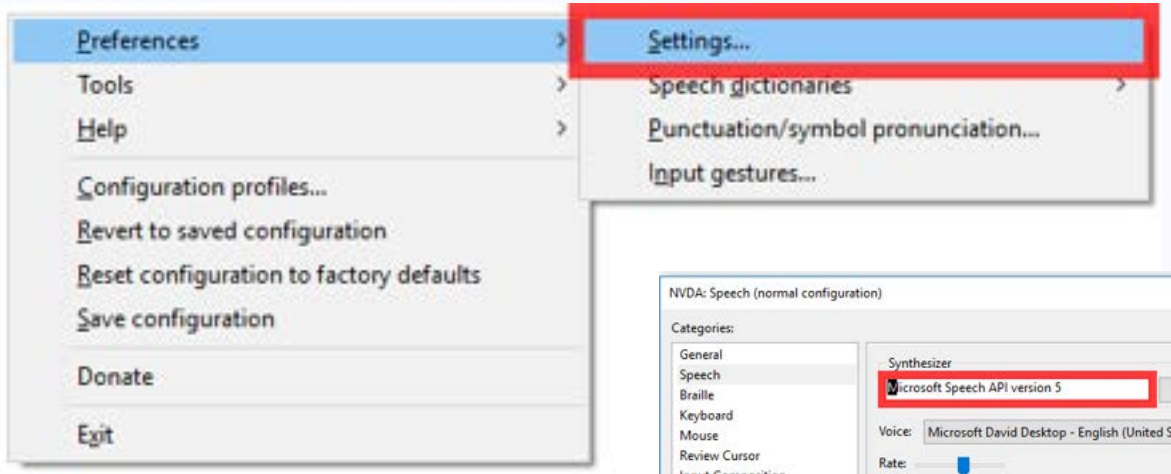
- **Pros:**
- **FREE!!! – Open Source**
- **Lightweight: fewer system resources used**
- **Frequent Updates: Quarterly**

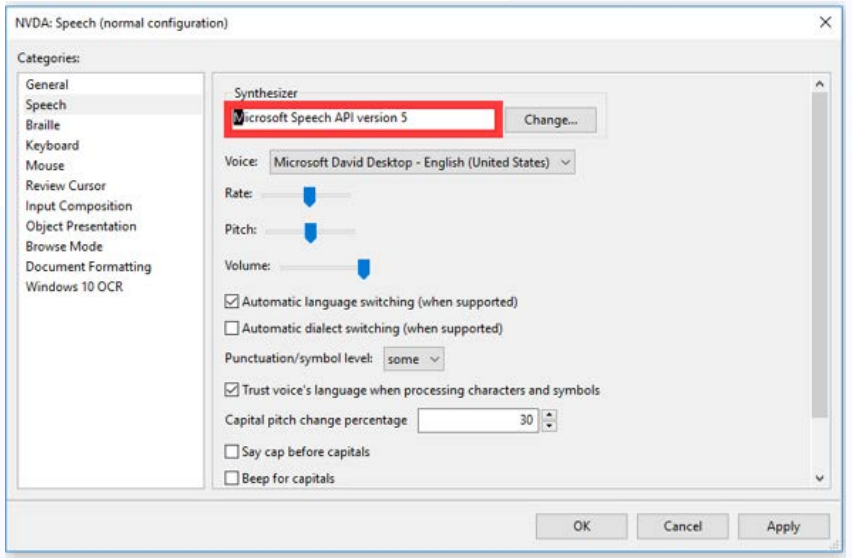
- **Cons:**
- **Lack of technical support**
- **Lacks compatibility with 3rd party applications**
- **Less frequently used in education and workplace than paid screen readers**
- **Poor quality synthesizer by default**

Changing NVDA Synthesizer

- **Change Default Synthesizer:**

1. **Select Preferences from Menu**
2. **Select Settings…**
3. **Select “Speech”**
4. **Select “Microsoft Speech API version 5”**





JAWS: Pros and Cons

- **Pros:**
- **Largest market share**
- **Excellent Technical Support**
- **Extensive scripts developed for 3rd party applications**

- **Cons:**
- **Expensive**
- **Tries to fill in "Accessibility Gaps" – Problematic for testing**
- **Lack of portability/versatility with installation**

Essential NVDA Shortcuts

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- NVDA Key: Insert or Caps Lock
- Stop: Control
- Quit: NVDA + Q
- Faster/Slower: Control + NVDA + Up/Down Arrow
- Previous/Next Line: Up/Down Arrow
- Read Current Line: NVDA + Up Arrow
- Read All: NVDA + Down Arrow
- Forms/Links: Tab
- Headings: H
- Graphics: G
- Buttons: B
- Landmarks: D
- Tables: T
- Navigate Table Cells: Control + Alt + Arrow Keys
- Toggle Forms Mode: NVDA + Space

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Essential JAWS Shortcuts

- JAWS Key: Insert
- Stop: Control
- Quit: Insert + F4
- Previous/Next Line: Up/Down Arrow
- Read Current Line: Insert + Up Arrow
- Read All: Insert + Down Arrow
- Forms/Links: Tab
- Headings: H
- Graphics: G
- Buttons: B
- Landmarks: R
- Tables: T
- Navigate Table Cells: Control + Alt + Arrow Keys
- Toggle Forms Mode: Enter

VoiceOver Shortcuts

- VO Key: Control + Option
- Stop: Control
- Rotor: VO + U, then Left/Right Arrow
- Speech Rate: VO + Command + Left/Right Arrow
- Previous/Next Item: VO + Left/Right Arrow
- Heading: VO + Command + H
- Table: VO + Command + T
- Graphic: VO + Command + G
- Activate Link/Form Control: VO + Spacebar

Additional Resources

WebAIM: Using NVDA to Evaluate Accessibility

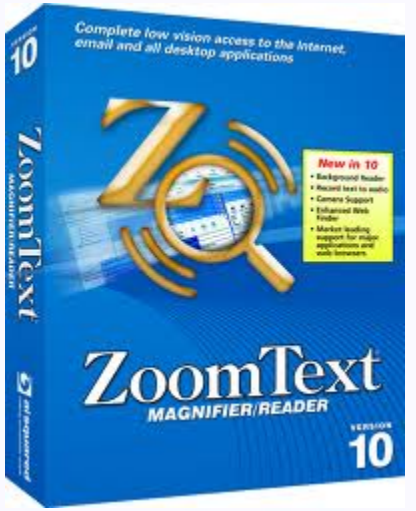
- WebAIM: Keyboard Shortcuts for NVDA

WebAIM: Using JAWS to Evaluate Accessibility

- WebAIM: Keyboard Shortcuts for JAWS

Screen Magnification Programs

- MAGic
- ZoomText
- Windows Magnifier
- Mac Zoom
- Zoom and Magnifier (iOS & Android)



Refreshable Braille Displays

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The World of Digital Touch

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Accessibility Testing on Mobile

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Smartphone and Tablet Testing

- What to Test On?
  - Consider Analytics
  - Consider Complaints Being Received
- iOS: VoiceOver
  - Smartphone: iPhone
  - Tablet: iPad
  - Browser: Safari
- Android: TalkBack
  - Smartphone: Nexus
  - Tablet: Nexus
  - Browser: Firefox

The Bohemoths of the Mobile Arena

- According to comScore, mobile traffic began outpacing traditional desktop access in 2014

- According to Gartner, 99.9% of all smartphone sales in 4th Quarter of 2017 were Android and Apple

Functional Differences Between iOS & Android

- iOS
  - Closed Architecture = Predictability
  - Stability
  - Hardware/Software Integration
  - OS updates pushed out simultaneously

- Android
  - Fragmentation of software and hardware
  - Many more devices on market
  - Commitment to accessibility not comparable

Gestures for iOS and Android

- **AppleVis**
- **Essential VoiceOver Gestures**

- **Android Accessibility Help**
- **Essential Gestures with Android**

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VoiceOver Demonstration

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Testing with Peripheral Devices

- **Compatible Bluetooth Keyboard**
  - **One Option: Universal Mobile Keyboard (MS)**

- **Essential Shortcut Keys with iOS**
- **Essential Shortcut Keys with Android**

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Testing by People with Disabilities

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Effective User Evaluations

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- **Evaluate websites/apps with real people to understand accessibility issues**
- Evaluate with users with disabilities to identify usability issues that are not discovered by conformance evaluation alone.
- Involving users early in web projects ensures better and easier accessibility
- Involving users with disabilities and having accessibility specialists evaluate in planned repairs can catch any problems before they are propagated throughout your site.
- Including users throughout the development process to complete sample tasks on prototypes can assist in understanding how the different aspects of the design and coding can be improved.

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Automated Testing & Code Inspection Tools

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Testing for Web Accessibility

- Sequential Approach
  - Order of the WCAG guidelines and success criteria
  - Some guidelines may be omitted
- Multiple methodologies can be applied

Identifying Common Components

- Determine what elements are featured on all pages
- Headers/navigation/footers are the most common

Selecting Sample Pages

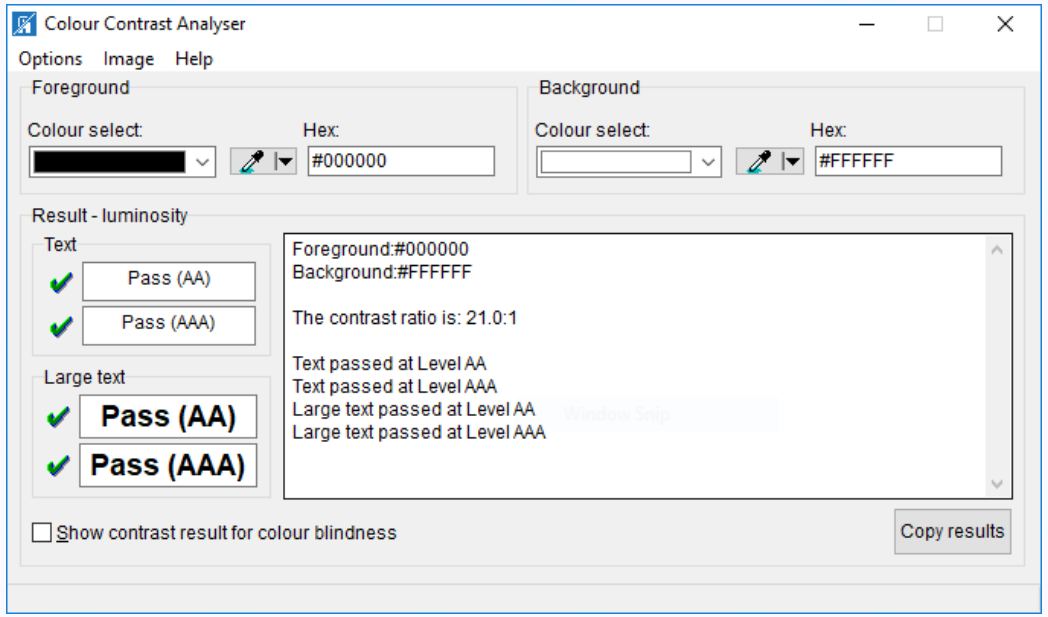
- Web page sample should reflect
  - High traffic pages
  - Common web pages – same template, features
  - Essential functionality
  - Types of web pages (text, forms, multi-media)
  - Web technologies
  - Other relevant pages (processes)

Tools for Testing

- Color Contrast Analyzer
- Bookmarklets
- Web Developer Extension by Chris Pederick
- Nu-Validator
- HTML Code Sniffer
- aXe by Deque
- WAVE

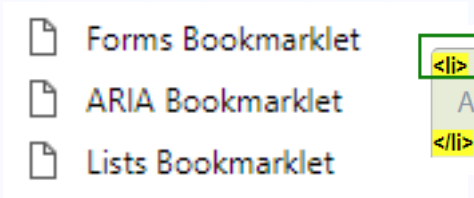
Color Contrast Analyzer

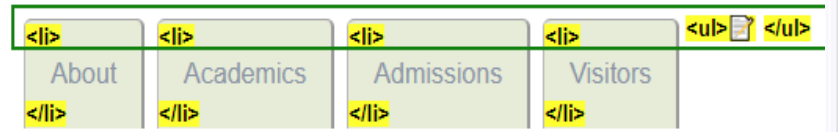
- Helps determine the legibility of text and the contrast of visual elements
- Includes WCAG 2.1 compliance indicators
- Color blindness simulator

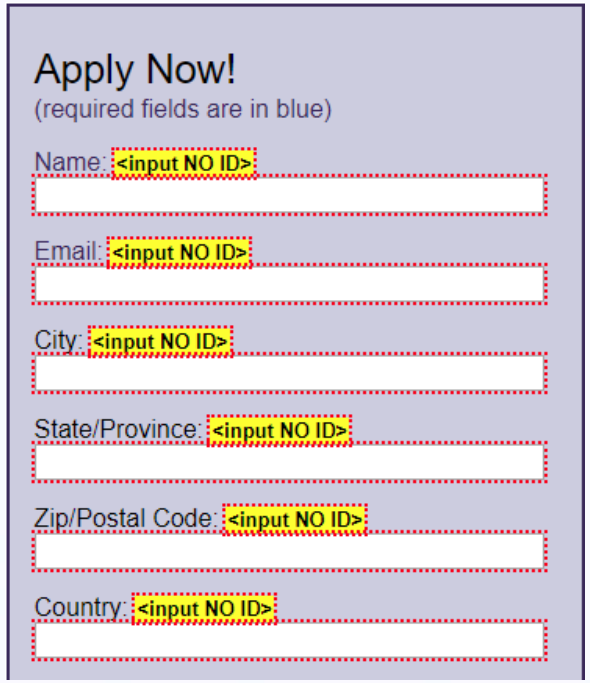


Bookmarklets for Accessibility Testing

- Uses JavaScript to highlight roles, states, and properties of accessibility elements

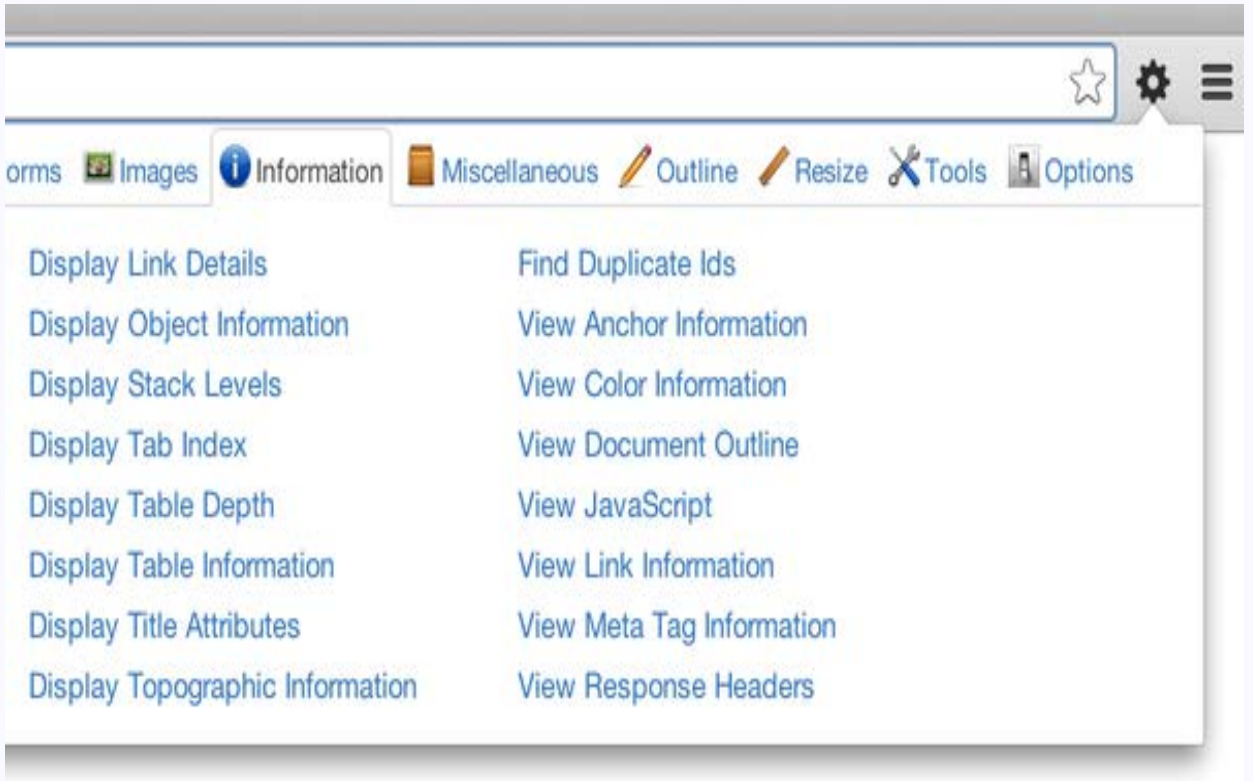






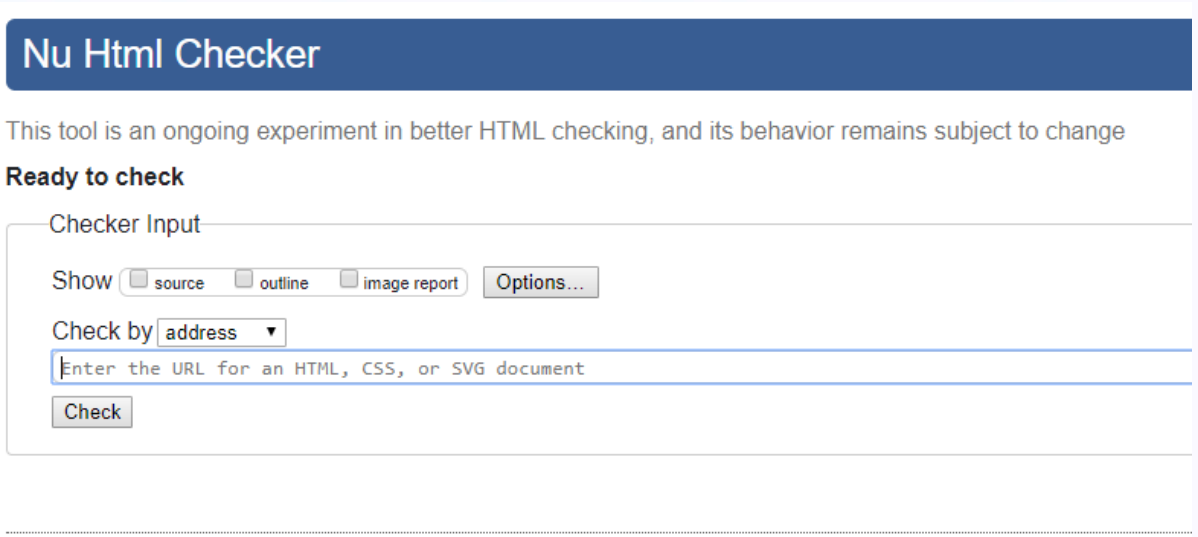
Web Developer Extension

- Adds a plethora of web developer tools to your browser



Nu Validator

- Assists users with validating code and detecting issues

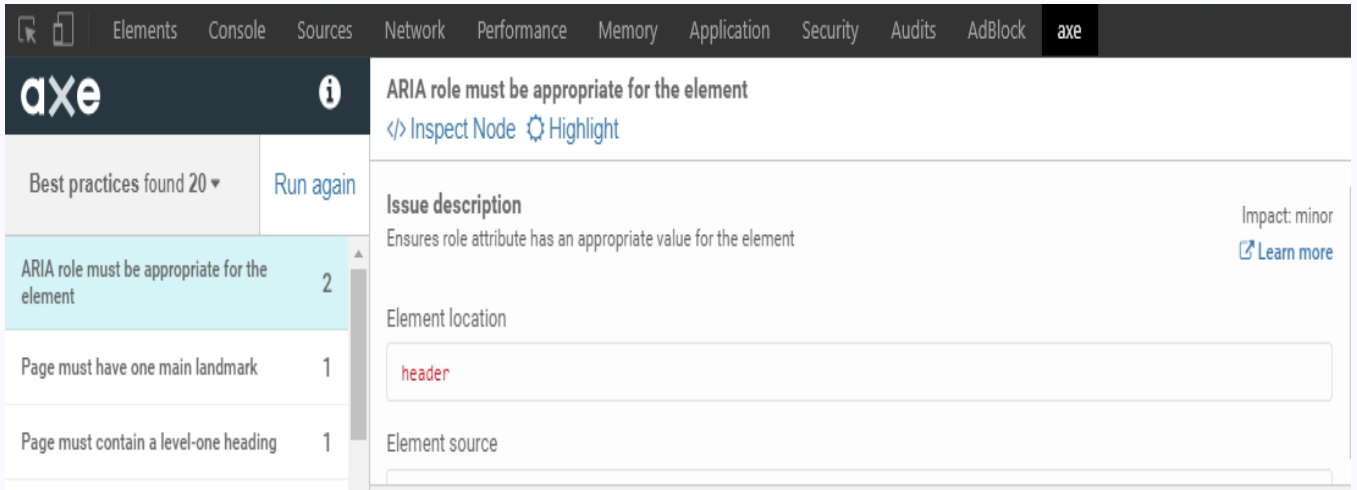


HTML Code Sniffer

- Checks HTML source code and detects violations

aXe by deque

- Tests for accessibility issues that can be accurately detected



WAVE

- Provides visual feedback by injecting icons and indicators into your page